RCOF Review 2017

ASEAN Climate Outlook Forum

Status Report (Survey)

Specific climate features of concerned region

Salient features of seasonal climate

Southeast Asia can be divided geographically into Mainland Southeast Asia and the Maritime Continent, with the two sub-regions overlapping the Malay Peninsula. The wet season in Mainland Southeast Asia starts in May, which marks the onset of the Asian summer monsoon. As the season progresses into boreal summer, monsoon rainfall covers the entire Mainland Southeast Asia and also Western and Southern Philippines. This is followed by a gradual transition with the monsoon convection marching southeastward to the Maritime Continent, where rainfall reaches annual maximum during the boreal winter. The transition into summer monsoon during spring is more abrupt.

Two sub-regions may therefore be identified in Southeast Asia with the summer and winter monsoon regimes, respectively, with the demarcation at the equator (Chang, et al., 2005a). However, the two rainfall regimes are not symmetric, with the winter regime intruding into the summer regime on the windward side of coastlines and mountains, where winter monsoon surges produce heavy rainfall. Therefore, high interest in seasonal winter forecast is shared by most countries in the region.

Sources of seasonal variation and predictability

The complex terrain of islands of different sizes and mountains interspersed among the surrounding seas creates significant local-scale variations of weather and climate. In addition to this spatial variations, year-to-year variations are influenced by El Niño Southern Oscillation (ENSO), where moderate to strong El Niño (La Niña) events can bring significantly drier (wetter) and warmer (cooler) conditions especially to the Maritime continent (Zhang, et al., 2015). Thus a significant part of the skill in seasonal forecasts in climate models is rooted in the ENSO (Wang, et al., 2009), with the largest area of skillful forecast in the Maritime Continent where the effects of the ENSO through anomalous Walker circulation and atmosphere-ocean feedback are well known. Thus, the prospect of useful operational seasonal forecasts is more promising in this region than in many other regions around the globe. On the subseasonal timescale, the Madden Julian Oscillation (MJO) is a major contributor bringing wetter (drier) conditions as its convective (suppressed) phase passes through the Maritime Continent (Xavier, et al., 2014; Chang, et al., 2005b). Another source of seasonal variation especially for the Mainland Southeast Asia is the tropical cyclone which, due to its limited predictability on the seasonal timescale, can easily upset rainfall predictions over affected areas.

Climate sensitive sectors

The main climate sensitive sectors for Southeast Asia include agriculture, water resources and forestry, which are sectors highly dependent on the spatial and temporal variability of the monsoon rains. This variability, which can be worsened by the ENSO, manifest itself as extended dry and wet periods and may lead to widespread droughts and floods within the monsoon seasons. Reduced crop yield, flooded cities and also increase in forest fires are some examples of consequences from these events. The impact on the health sector can also be considerable due to infestation of diseases (e.g. dengue), that are partly influenced by climate.

Food and water security, poverty eradication, health, economic and development activities embody the great challenges for the Southeast Asian region in the context of global climate change.

The RCOF background

The Association of Southeast Asian Nations Climate Outlook Forum (ASEANCOF) is a biannual meeting to discuss the regional issues related to weather and climate. It was established in 2013, following the strong support given by the 35th Meeting of the ASEAN Sub-Committee on Meteorology and Geophysics (ASCMG) held in Manado, Indonesia (July 2013) for the proposal for a Regional Climate Outlook Forum (RCOF) in Southeast Asia.

The first ASEANCOF session, ASEANCOF-01, was held in Singapore in December 2013. In the organising of ASEANCOF sessions, the ASEAN Specialised Meteorological Centre (ASMC) coordinates with the host country that conducts the sessions. ASEANCOF sessions are attended by representatives from the 10 National Meteorological and Hydrological Services (NMHSs) of ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam), the World Meteorological Organization (WMO) Global Producing Centres of Long-Range Forecasts (GPCLRFs), the WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble (WMO LC-LRFMME), as well as other producers of global seasonal outlooks such as the Asia-Pacific Economic Cooperation Climate Centre (APCC) and the International Research Institute for Climate and Society (IRI). ASEANCOF also involve, in relevant themed-sessions, regional agencies such as the Regional Integrated Multi-Hazard Warning System for Africa and Asia (RIMES), the Mekong River Commission, the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre), and the Global Water Partnership Southeast Asia (GWP-SEA). Other end-user agencies in water resources, flood, agricultural, and disaster-risk management sectors had also been invited to ASEANCOF sessions with the relevant themes to share on user requirements and challenges in the use of seasonal forecasts.

The RCOF process

The two ASEANCOF meetings are held in May (online meeting) and November (physical meeting) ahead of the boreal summer monsoon and boreal winter monsoon seasons respectively. As of July 2017, eight ASEANCOF sessions have been conducted. Typically, a "pre-COF" precedes the main COF meeting to provide training and capacity development not just to the representatives of the NMHSs but also to participants from the end-user agencies. Topics covered include multi-model ensemble predictions systems, verification methods, subseasonal and seasonal predictability, tropical cyclone predictions, climate monitoring tools, and robust application of outlook.

At the main meeting, the forum reviews the current climate conditions in Southeast Asia and the current state of large-scale circulation features such as those associated with the ENSO and the Indian Ocean Dipole (IOD). Multiple forecasts for the upcoming season are presented by the NMHSs and global climate centre participants using a mix of dynamical and statistical modelling techniques and products. These are then assessed leading to the consensus outlook, which are tercile probabilistic rainfall and temperature forecasts and assessment of the likelihood of ENSO, IOD and tropical cyclone affecting the region in the upcoming season.

The review of the previous outlook is also done at the main meeting with discussions on how representative the probabilistic temperature and rainfall outlooks are with respect to available regional gridded data and the NMHS' experts assessment of what happened locally in their respective countries. The review is included in the consensus outlook report.

Capacity needs

Observational and model data

Adequate observational data, including geographical coverage and technical staff to maintain equipment, has been highlighted as one of the primary needs of NMHSs. There is some sharing of data across boundaries, there are still policies in place that restrict free and open-sharing. Increased data availability in the Operational Data Services node of the proposed WMO RA V Southeast Asian Sub-region RCC Network (SEA RCC-Network) may help address this second point, both in sharing the data, and in demonstrating the usefulness of such a dataset.

Lack of model data at the national, regional and international level is also seen as a gap in the region for generating and delivering climate products and services. The inclusion of GPC representatives during ASEANCOFs helps disseminate seasonal model data and products to the participants. Training during the pre-COF also can help participants learn about the various available products as well. With the future formation of the SEA RCC-Network, hopefully more structured products for the region will become available.

Climate Products

Overall, the region has fairly adequate capabilities for seasonal outlooks through ASEANCOF and NMHSs. However, information related to uncertainties and skill of the products is lacking through the region. Guidance is given through the pre-COF training, although this could be more systematic and included in the outlooks.

Training

Training is in demand, as very few NMHSs have the capacity to conduct the training or provide the expertise themselves. The pre-COF training, along with other WMO training initiatives, are more utilised by NMHSs than other forms such as e-learning. Therefore, maintaining the training aspect is important. Going forward, there is the potential to use the SEA RCC-Network as a portal for past training materials, so that the information can be subsequently used.

Communication

There is also a need for better communication with the RCOF users. While most NMHSs conduct monthly briefings with users, only one NMHS conducts regular market study as platform to engage users and conducts socio-economic study of their climate services to demonstrate their value to users. ASEANCOF allows for the various NMHSs to share experience, but there is room for further development in how, as a whole, Southeast Asia can better engage and communicate with users.

User involvement

Overall, users that have been involved in the program include those from agriculture, health and water sectors. Users have directly attended part of the forum to present to the group how they make use of climate services. During ASEANCOF-7, representative from the ASEAN Specialised Meteorological Centre, Rice Watch and Action Network, the Be Secure Project, and World Food Program all presented on various climate services that they produce or use.

The user needs and evaluations are mostly expressed via the NMHS. During ASEANCOF-7, participants were asked to summarize the various climate services in their country, particularly with a focus on disaster risk reduction, agri-water resources planning and related sectors. Limitations in the products have been expressed, such as the desire for downscaled products. These are discussed as part of the general review of ASEANCOF, which takes place at the end of the forum, as well as in the individual presentations.

It has also been highlighted that many of the NMHSs feel the need to be more recognised as a provider of climate services. This gap could potentially be achieved through training for the

end-users themselves, although as highlighted previously, training capacity is limited in the region.

SWOT analysis

Strengths

- Sharing of skills and experiences between NMHSs: an example from the Philippines, Rice Watch, help to localize the climate services from the NMHSs by training locals, providing early warning systems and helping establish thresholds.

- Sharing of skills/tools from GPCs: during the forums, participants use the tools and data shared during the pre-COF training sessions to update their seasonal outlooks.

- Inputs from international experts (WMO GPCs and other scientists) help to provide robust interpretation of model outlook for temperature, rainfall and processes that affect the region such as ENSO.

Weaknesses

- Staff availability: often the resources from NMHSs mean that the participants vary for each meeting. Change in staff can make it difficult for continuity in the physical meetings. There can also be a language barrier for some of the staff attending. Furthermore, while participants benefit from the training, it can be challenging for them once returning home to share among their colleagues and for the transfer of knowledge to be maximised.

- Data availability: sharing of data between boundaries still remains a challenge. This is particularly important for verification of the forecasts.

- Consistency: due to the spatially complex and diverse nature of the climate in the region, applying consistent definitions for e.g. monsoon onset and ENSO significance and impacts across the region is difficult.

Opportunities

- The good predictive skill in the region should make it possible to include more indicators and products for seasonal, and even sub-seasonal outlooks.

Threats

- The main threat would be funding. Many of the NMHSs in the region do not have the capacity to hold a physical forum, due to lack of funds. External funding source is therefore needed to help in the rotation of the physical forum through the various countries.

Sustainability of RCOF

The current process tries to rotate the physical meeting (November session) among the various NMHSs in the region, with the preceding online forum (May session) to be hosted by the same country. Having only one physical meeting per year helps reduce the cost and be more resource efficient, while still keeping the valuable face-to-face time between the various countries.

We are currently exploring how to streamline the online hosting of the forum. Video conference calls are difficult due to the variable connection speeds across the region, however, an online chat session seems to be beneficial.

We are currently undergoing a review for sources of funding for the physical meeting. We are looking to possibly join with the end-user groups or other partners in the ASEAN community for support, as well as to help with disseminating climate services and information.

Online workshops and tutorials may also help to improve outreach by allowing all-time access to materials, and would be particularly useful for example in enabling participants to refresh in a particular topic at a later date.

Way forward

There is much promise for the region to produce useful and skillful products. How to incorporate uncertainty into the outlooks, what other parameters to asses (based on user needs), and how to objectively evaluate the forecasts given the limitations in satellite products, are all important research questions to answer. Particularly at sub-seasonal level, there seems to be the opportunity to produce better forecasts based on model skill.

The challenge will be how to bring these altogether at the regional level. Products often need to be tailored for a particular user, and given the limited resources in the region, the designing of such products will need to be streamlined. Perhaps by having more meetings with NMHSs and users actively engaging with one another will help bridge this gap.

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